

## **Integrated Circuit Package Structure**

### **BACKGROUND OF THE INVENTION**

#### **1. Field of the invention**

The present invention relates to an integrated circuit package structure, and more particularly, to a large power, high frequency integrated circuit package with excellent heat dissipation effect, and easy replaceability.

#### **2. Description of the Prior Art**

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Being capacious to accommodate numerous components in a minimized space to greatly reduce size of the product, the integrated circuit package has played a important role in the progress of electronic technology.

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To ensure reliable performance of a large power IC package to work at a high frequency, it must to have a good grounding effect. The good grounding effect can be achieved by a good conductivity, a large contact are with the grounding conductor, and short grounding passage.

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To make a grounding passage as short as possible, the grounding wire of the IC package is conventionally directly weded to its circuit board. However, to ground an IC package in such way intending to achieve the purpose of minimizing the ground passage for a large power IC package working at a 25 high frequency, for example, a sophisticated TI-Pack is absolutely inapplicable for reason that the grounding wire is

inallowable to directly weled to the circuit board for the sake of heat dissipation problem. Meanwhile, there are extra problems of maintenance and component replacement to be considered.

5        In order to solve the above described problems, the present inventor carried out theoretical studies and simulating experiments, and based on these studies and researches, the present inventor came to propose the present invention.

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## SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a large power IC package workable at high frequency with good heat dissipation effect by enlarging the contact area 15 with the grounding conductor of shortest passage so as to expel large grounding current thereby assuring the quality and durability of the IC package.

To be capable of facilitating flow of the grounding current, the bottom portion of the IC package is formed of a 20 broad heat dissipation area associated with many fins.

It is another object of the present invention that this IC package is easy for assembly and convenient for component replacement so as to assure reliable performance.

For further understanding of the nature and objects of the 25 present invention, reference should be made to the following detailed description taken in conjunction with the accompanying drawings provided below.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The drawings disclose an illustrative embodiment of the present invention which serves to exemplify the various advantages and objects hereof, and are as follows:

- 5        Fig. 1 is a perspective three dimensional exploded view of the IC package according to the present invention;
- Fig. 2 is an schematic assembly view of the grounding plate with the first conductor plate according to the present invention; and
- 10      Fig. 3 is a perspective three dimensional assembly view of the IC package according to the present invention.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

- 15      Referring to Fig. 1 through Fig. 3, the IC package structure is essentially composed of an IC package 1, a first conductor plate 2, a second conductor plate 3, and a press block 4. The IC package 1 has a signal input terminal 11 and a signal output terminal 12 respectively located at its front side  
20 and rear side thereof for conducting the functional signal current. A plurality of grounding plates 13 are provided at two sides of the path of the signal current which flow form the input terminal 11 to output terminal 12. The grounding plate 13 possesses a broad area and good conductivity sufficient to  
25 let through a large grounding current of the IC package 1.

The first conductor plate 21 covering over the IC package 1 has downwardly flexed edges at its both sides to or two lugs 21. The lug 21 has several screw fitting holes 22 for engaging with the IC package 1 appropriately by screws. On the 5 contrary, the grounding plate 13 is upwardly cambered to wrap the first conductor plate 2 (see Fig. 2), and press forcibly onto the first conductor plate 2 to make the two conductor plates 13 and 2 perfectly in contact with each other. The second conductor plate 3 having a similar shape to the first 10 conductor plate 2, is covering over the closely coupled first and grounding conductor plates 2 and 13 for further enhancing the fixing and grounding effects, and serving to increase the heat dissipation area. It should be noted that the two side edges of the second conductor plates 3 are also downwardly 15 flexed to form two lugs 31. The lug 31 is also provided with several screw fitting holes 32. Here, the press block 4 is used to press the structure constructed as such. The press block 4 is configurated so as to have an inner cavity 41 to shade the assembled structure of IC package 1, the first and the second 20 conductor plates 2 and 3. There are two slots 42 formed under the bottom of the press block 4 in the inner cavity 41 and which are parallel to the signal current passage and just located above the grounding conductor plate 13. Each slot 42 is fitted with an elastic bar 43 which is emerged downwardly 25 to press the grounding conductor plate 13, the first and the second conductor plates 2 and 3 beneath. There are four

corner screw fitting holes 44 provided for the press block 4 so as to engage the press block 4, the second and the first conductor plates 3 and 2 together with fixing screws 5 screwing into the holes 44, 32, and 22 therefore completing 5 the assembly of the IC package 1.

It should be noted that there are the signal input and output terminals 11, 12 and four grounding conductor plates 13 are illustratively shown in Fig. 1, but this shall not be construed to be an exclusive structure for the IC package of 10 the present invention. According to different requirement, the type of the IC package 1 can be changed, thus the amount and location of the above mentioned components are variable.

As described above, a conventional large power, high frequency sophisticated IC package such as a TI-Pack, an 15 installation of a heat dissipation plate 6 is necessary to dissipate generated heat. In such a case, the grounding conductor must seek for a circuitous route to detour the heat dissipation plate 6 in order not to be affected by the heat generated from the IC package. On the contrary ,the IC 20 package of the present invention first uses the first conductor plate 2 to cover the IC package 1, and then the grounding conductor plate 13 of the IC package 1 is cambered upwardly so as to closely in contact with the first conductor plate 2, afterwards second conductor 3 and the press block 4 are 25 overlapped thereon in order such that the elastic bar 43 fitted in the slots 42 of the press block 4 applies a pressure on the

grounding conductor plate 13, the first conductor plate 2, and the second conductor plate 3 to forcibly conjoin them together, and in final stage, the aforesaid components are further engaged using the fixing screws 5. With this structure, the IC package structure of the present invention is characterized in possessing a large heat dissipation area and minimized course of the grounding conductor, besides, the effect of heat dissipation is further enhanced by forming tow layers of conductor plates 2 and 3. As a result, the IC package constructed according to the present invention achieves most optimistic heat dissipation effect.

In short, it emerges from the above description that the invention has several noteworthy advantages, in particular:

1. That the grounding effect, heat dissipation, performance and quality are the best of all equivalents.
- 15 2. The easily assembled structure results in a low cost maintenance and components replacement.

Those who are skilled in the art will readily perceive how to modify the invention. Therefore, the appended claims are to be construed to cover all equivalent structures which fall 20 within the true scope and spirit of the invention.

#### **What is claimed is :**

- 25 1. An IC package structure comprising:  
an IC package at least having a signal input terminal and a signal output terminal, and a plurality of grounding